FACT SHEET FOR NPDES PERMIT WA-002918-1

FACILITY NAME: West Point Sewage and Combined Sewer Overflow (CSO) Treatment Plants

SUMMARY OF CHANGES FROM PREVIOUS PERMIT

- At the request of the permittee, the discharge limitation was changed from BOD_5 to $CBOD_5$. The $CBOD_5$ average monthly limit is 25 mg/L (44,800 lb/day) and the $CBOD_5$ weekly average limit is 40 mg/L (71,700 lb/day).
- For the West Point outfall, the discharge limitation for total residual chlorine was reduced from an average monthly limit of 216 µg/L to 160 µg/L (285 lb/day). The maximum daily limit was reduced from 546 µg/L to 420 µg/L. This was a result of a decrease of the acute dilution ratio.
- For the West Point outfall, the dilution attained at the edge of the chronic mixing zone was changed from 231:1 to 153:1. The dilution attained at the edge of the acute mixing zone was changed from 42:1 to 32:1. This a result of the dilution modeling submitted with the application for permit renewal.
- For the West Point Plant, the required percent removal for $CBOD_5$ and TSS during the wet season from May through October was changed from not applicable to 80%.
- The effluent limits for Carkeek CSO Treatment Plant were changed from 60 mg/L TSS yearly average to a total percent removal limit for total suspended solids of 50% or greater. Water-quality based limits were established for fecal coliform bacteria and chorine at 2,800/100 mL geometric mean and 490 µg/L daily maximum, respectively. A 2-year compliance schedule was established to meet these limitations.
- The discharge limitation for Carkeek CSO Treatment Plant was changed from 14 million gallons per year (MG/yr) to 46 MG/yr based on based on new information provided by King County and approved by the Department.
- The effluent limits for Alki CSO Treatment Plant were changed from 60 mg/L TSS yearly average to a total percent removal limit for total suspended solids of 50% or greater. Water quality based limits were established for fecal coliform bacteria and chorine at 1,700/100 mL geometric mean and 290 µg/L daily maximum, respectively. A 2-year compliance schedule was established to meet these limitations.
- The requirement to analyze weekly for Cyanide in the effluent was removed since there is no reasonable potential to exceed the water quality standard based on past data submitted during the previous permit.
- At the request of the permittee, the Discharge Monitor Report (DMR) and monthly summary report shall be submitted by the 25th day of the month.
- A letter confirming annual review of the Operations and Maintenance Manuals is required.

SUMMARY OF CHANGES FROM PREVIOUS PERMIT (CON'T)

- The acute critical effluent concentration (ACEC) and chronic critical effluent concentration (CCEC) used in whole effluent toxicity (WET) testing were changed as a result of changes to the dilution zones. Refer to S9. and S10. for the ACEC and CCEC, respectively.
- The requirement to comply with the nine minimum controls (NMC) for CSOs was clarified in S12.
- S.13 as added to clarifier Wet Weather Operation.
- S.14 Reclamation and Reuse was deleted from the permit as the West Point Treatment Plant will be using reclaimed for internal use only.
- The general conditions are updated in accordance with the Department's July, 2002 permit shell.

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Appendix G--TSD CALCLUATION SPREADSHEETS

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	King County Wastewater Treatment Division 201 South Jackson Street Seattle, Washington 98104-3855
Facility Name and Address	West Point Treatment Plant 1400 Utah Street West Seattle, Washington 98199
Type of Treatment	Secondary, Activated Sludge Treatment
Discharge Location	Puget Sound, Water Way Segment #04-08-04 West Point Treatment Plant Latitude: 47° 39' 38.8" N Longitude: 122° 26' 55.1" W Carkeek CSO Treatment Plant Latitude: 47° 42' 45.5" N Longitude: 122° 23' 16.4" W

GENERAL INFORMATION	
	Alki CSO Treatment Plant Latitude: 47° 34' 12.9" N Longitude: 122° 25' 21.0" W
Water Body ID Number	WA-PS-0240

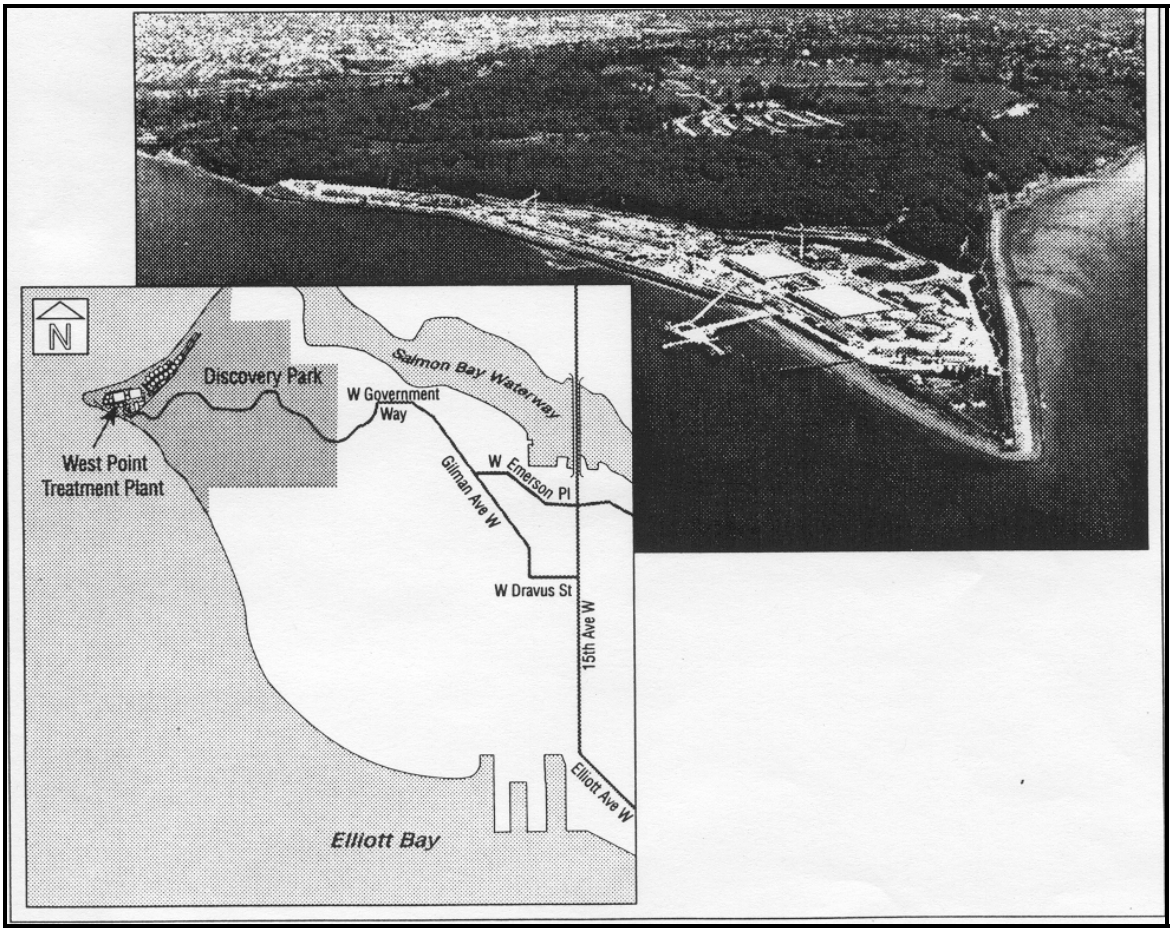

Figure 1. Vicinity Map for West Point Wastewater Treatment Plant

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

King County owns approximately 80 acres of land at the West Point site. Twenty acres of this land is sub-tidal. The current facilities are located on approximately 25 acres of land. The West Point Treatment Plant was first constructed in 1965 as a primary treatment plant. In 1972, the amended Federal Water Pollution Control Act (PL 92-500) established the National Pollutant Discharge Elimination System (NPDES) and pretreatment programs. Federal law provided that all sewage treatment plants were to meet secondary treatment requirements by July 1, 1977. During the period 1976-1977, METRO (Municipality of Metropolitan Seattle), the agency

having ownership of the plant at the time, prepared a draft facility plan and Environmental Impact Statement (EIS) and submitted a request for federal funding through EPA Grant No. C0530816-01 to meet the requirement of reaching secondary treatment at West Point. In 1979, METRO applied to the USEPA for a Clean Water Act Section 301(h) Waiver from secondary treatment at West Point, Richmond Beach, and Carkeek. METRO also planned to apply for a waiver for the Alki Treatment Plant. This process was finally resolved on September 7, 1984, when METRO fully withdrew from the 301(h) waiver process. On September 24, 1984, METRO was issued an Administrative Order, Docket No. DE 84-577. The Order directed METRO to proceed with planning for secondary treatment at West Point and set a schedule for attaining secondary treatment no later than February 1, 1991. In November 1987, the Order was amended by Consent Decree No. 87-2-05395-4 changing, among other things, the final compliance date to December 31, 1995. On January 1, 1994, King County assumed control of Metro's assets and obligations under the existing NPDES permits issued by the Washington State Department of Ecology.

On December 8, 1995, the Department of Ecology certified the West Point Treatment Plant achieved the secondary treatment level.

The West Point Sewage & Combined Sewer Overflow (CSO) Treatment Plant is operated by the King County Department of Natural Resources Wastewater Treatment Division. The treatment plant is located on the Puget Sound at the tip of West Point between Shilshole Bay and Elliott Bay. It is the largest of King County's treatment plants.

A total of 16 municipalities, sewer districts (SDs), and water districts (WDs) convey wastewater to King County's wastewater treatment facilities. The service area encompasses an area of approximately 118 square miles (75,380 acres) with a population of approximately 1.37 million. The following is a list of the municipalities, sewer districts, and water districts that contribute wastewater to this facility.

Flows to West Point Service Area Only	**Flows to South Plant Service Area Only**	**Flows to either or both area(s) depending on local service configuration, regional service connections and weather conditions.**
Seattle – portions of	Algona, City of	Bothell, City of
Brier, City of	Auburn, City of	Cross Valley WD
Val Vue – portions of	Bellevue, City of	Redmond, City of
Lake Forest Park, City of	Black Diamond, City of	Seattle, City of – portions of
Lake Forest Park, City of	Cedar River W&S Dist.	Woodinville WD
Ronald WW Dist – Portions of	Coal Creek Utility Dist.	Alderwood W&WW Dist.
	Issaquah, City of	NE Sammamish S&W Dist.
	Kent, City of	Northshore Utility Dist.
	Kirkland, City of	Val Vue SD – portions of
	Lakehaven Utility Dist.	Bryn Mawr-Lakeridge SD-

Flows to West Point Service Area Only	Flows to South Plant Service Area Only	Flows to either or both area(s) depending on local service configuration, regional service connections and weather conditions.
		portions of
	Mercer Island, City of Pacific, City of Renton, City of Soos Creek W&S Dist. Tukwila, City of Sammamish Plateau W&S Bryn Mawr-Lakeridge SD- portions of	
Flow Transfer Agreement	Flow Transfer Agreement	

In addition to the domestic sewage, nearly all of Seattle's industrial areas discharge to the West Point Treatment Plant. It receives an estimated daily flow of 0.92 MGD from industrial sources. King County notes this flow represents approximately 0.78% of the flow to West Point. The plant also provides treatment of domestic sewage and combined sewer overflows from the Carkeek Park CSO Treatment Plant and the Alki CSO Treatment Plant.

The population served is projected to increase from a base of 1,366,000 in 1999 to approximately 1,373,000 by 2005. The population projections take into account planned changes in apportionment of flows between the West Point Treatment Plant and the South Treatment Plant. Presented in the following table is a summary of the flow, BOD, and TSS projections.

Year	Population	Average Annual Flow (MGD)	BOD Loading (pounds)	TSS Loading (pound)
1999	1,336,000	129.4[1]	179,500[1]	187,100[1]
2005[2]	1,373,000	130.1	180,400	188,100
Design		142	168,000	181,000
Note: [1] = Flow, BOD loading, and TSS loading are actual 1999 figures [2] = Projection based on actual 1999 figures				

King County will be constructing a 36-million gallon per day secondary treatment plant in either north King County or south Snohomish County by 2010 or as soon as possible thereafter. Upon completion, wastewater from north of Lake Washington including Bothell, Lynnwood and parts of Snohomish County that are currently routed to the West Point Treatment Plant will be rerouted to the North Treatment Plant. West Point Treatment Plant will primarily serve the city of Seattle.

King County has planned primary/secondary enhancements at the West Point Treatment Plant in 2018 to accommodate additional flows from completed CSO control projects.

The West Point Treatment Plant is rated as a Class IV treatment plant.

Carkeek CSO Treatment Plant

The Carkeek CSO Treatment Plant was constructed in 1962 as a primary treatment plant to serve the Carkeek Basin. It is located at 1201 NW Carkeek Park Road. In 1994, the plant was converted to a pumping station/CSO treatment facility. It was placed into service on November 1, 1994, under its then existing NPDES Carkeek permit, WA-002917-3. The present permit limits for the Carkeek CSO Treatment Plant were established under the existing West Point permit, which became effective on January 1, 1996.

During normal operation (pump station only), the West Point pump crew services the pump station and CSO Treatment Plant three times a week. During a storm, West Point off-site operators staff the plant during start up, shut down, preventative maintenance, and operational checks.

Alki CSO Treatment Plant

The Alki Treatment Plant was constructed in 1958 as a primary treatment plant to serve the Alki Basin, an area of 4,095 acres. It is located in West Seattle at the intersection of Beach Drive and Benton Place on 2.8 acres. The service area is largely residential with a projected saturation population of 43,700. Commercial activity is concentrated along portions of California Avenue and S.W. Alaska Street. There are no significant industrial users discharging to the Alki plant. The plant was overhauled in 1987 by architectural enclosure of facilities and retrofit of mechanical and electrical systems. In 1998, the plant was remodeled to operate as a near-fully automated CSO treatment plant. Related projects included the construction of the West Seattle Pump Station, the West Seattle Tunnel, and other flow transfer pipelines. On July 15, 1998, Alki phased out its operation as a sewage treatment plant. On October 25, 1999, the Alki Treatment Plant was incorporated into the West Point Treatment Plant NPDES Permit. Prior to 1999, the plant operated under NPDES Permit No. WA-002901-7.

Incoming flows less than 18.9 MGD are transferred to the West Point Treatment Plant for secondary treatment. Flows above 18.9 MGD and above the 7.1 million gallons stored in the West Seattle Tunnel, up to a maximum of 65 MGD receive primary treatment and disinfection at the Alki plant with discharge via an outfall to Puget Sound. To protect the Alki plant, flows in excess of 65 MGD are discharged via the 63rd Avenue Pump Station outfall, a permitted CSO location.

Staff from the South Wastewater Treatment Plant operate and provide maintenance for the plant.

COLLECTION SYSTEM STATUS

The King County wastewater service area is divided into the East Section and the West Section. Wastewater from the East Section is conveyed to the South Treatment Plant; the West Section

wastewater goes to the West Point Treatment Plant. The West Section service area includes areas north and west of Lake Washington and the city of Seattle. Developments within the north Lake Washington area were constructed with separate sanitary and storm sewers. Within the city of Seattle, approximately 42,000 acres or 75% of the total area is constructed with combined sewers. Sanitary and combined flows from Seattle are merged prior to arriving at the West Point Treatment Plant.

West Point Treatment Plant receives wastewater from the West Division Collection System, a series of pump and regulator stations and related trunks and interceptors. The Fort Lawton parallel tunnel and the Old Fort Lawton tunnel convey the collected wastewater into the treatment plant.

The flow through the West Division Collection System is monitored and controlled automatically by the Computer Augmented Treatment and Disposal computer system. The control system is designed to minimize surges and combined sewer overflows.

In the near-term, the county will be constructing major improvements to the conveyance system in support of the upcoming North Treatment Plant. This 36-million gallon per day secondary treatment plant is to be located in the North Service Area and to be operational by 2010 or as soon as possible thereafter.

During the next 30 years, King County will be implementing minor trunk improvements as part of the county's Conveyance System Improvement Program. The program is designed to provide additional capacity for the smaller basins served by King County, e.g., increasing conveyance line and pump station capacities or extending service.

COMBINED SEWER OVERFLOW

King County has 37 combined sewer overflows, discharges of untreated sewage and storm water during periods of heavy precipitation events, within the city of Seattle. The collection system, as configured in 1983, discharged nearly 2.3 billion gallons per year of untreated sewage and storm water from a total of 431 overflow events. Since 1988, the Metro/County has completed a number of projects to effect reduction of the volume and frequency of CSOs. Currently, King County CSO volume is approximately 1.5 billion gallons per year from 331 overflow events.

In November 1999, the Metropolitan King County council adopted the Regional Wastewater Services Plan, a supplement to the King County Comprehensive Water Pollution Abatement Plan (Ordinance 13680). The plan includes over 20 CSO control projects to reduce CSOs to one untreated event per year at each CSO location to be completed by 2030. The first priority projects are locations near bathing beaches.

The following table is an outline of the CSO projects in the Regional Wastewater Service Plan presented in the *2000 CSO Control Plan Update*.

CSO Project	Project Description	Capital Cost 1998 $mil	Year Controlled
Completed 1988 Plan Projects		$60.5	1997
Committed Projects[1]		$194.9	2004
South Magnolia	1.3 MG storage tank	$6.8	2010
SW Alaska Street	0.7 MG storage tank	$4.3	2010
Murray Avenue	0.8 MG storage	$5.1	2010
Barton Street	Pump station upgrade	$9.3	2011
North Beach	Storage tank/pump station expansion	$3.9	2011
University-Montlake	7.5 MG storage	$53.5	2015
Hanford #2	3.3 MG storage/treatment tank	$27.9	2017
West Point Improvements	Primary/secondary enhancements	$16.9	2018
Lander Street	1.5 MG storage/treatment at Hanford	$26	2019
Michigan Street	2.2 MG storage/treatment tank	$32.4	2022
Brandon Street	0.8 MG storage/treatment tank	$13.1	2022
Chelan Avenue	4 MG storage tank	$18.3	2024
Connecticut Street	2.1 MG storage/treatment tank	$31.9	2026
King Street	Conveyance to Connecticut treatment	$3.2	2026
Hanford at Rainier	0.6 MG storage tank	$3.3	2026
8th Avenue South	1.0 MG storage tank	$6.9	2027
West Michigan Street	Conveyance expansion	$0.4	2027
Terminal 115 (Pier 105)	0.5 MG storage tank	$3.9	2027
3rd Avenue West	5.0 MG storage tank	$28.3	2029
Ballard	1.0 MG storage tank	$2.9	2029
11th Avenue NW	2.0 MG storage tank	$12.9	2030

Note: [1]Includes Harbor, Denny, Dexter, Norfolk, and Henderson/MLK Way

Currently, there are two CSO projects underway. These are the Denny/Lake Union CSO Project and the Henderson/Martin Luther King Way CSO Project.

Upon completion, the Denny/Lake Union CSO Project will reduce CSO discharges from the county's largest CSO from approximately 50 untreated discharges per year to one untreated discharge per year. During small and moderate storms, the system will store the flows and transfer them to the West Point Treatment Plant for treatment. For very large storms, about one-half of the volume will be transferred to the West Point Treatment Plant; the remainder will be treated on-site and discharged to Elliott Bay. This project is expected to be completed in the year 2004.

The Henderson/MLK CSO Project is expected to be completed in the year 2004. It is designed to discharge treated CSO into the Duwamish River from the Norfolk CSO location. This effort is projected to allow the facility achieve the Ecology standard of no more than one untreated overflow/year.

INFLOW AND INFILTRATION

The 1999 Regional Wastewater Services Plan incorporated a four-phase program (the Regional Infiltration/Inflow Control Program) to reduce inflow and infiltration in the local system. Beginning in 1999 and continuing through 2004, King County will:

- **Define current levels of inflow and infiltration:**

  Within the West Point Treatment Plant service area, King County installed 22 flow meters in March 2000 to capture baseline data and several hundred additional temporary flow monitors within the local component systems. Due to the drought during the first study period of November 1, 2000 through January 15, 2001, King County reinstalled the hundreds of temporary flow monitors for a second 10-week study from November 1, 2001 through January 15, 2002. The drought during the first year's monitoring effort has extended the program and its target milestones by one year.

- **Construct demonstration projects for collection system rehabilitation:**

  On April 30, 2002, members of the Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC) selected ten pilot projects representing a regional geographic balance (including several within the West Point service area). SSES work is being done during summer and fall 2002, design and construction in 2003 with post-construction monitoring beginning November 1, 2003.

- **Develop model design and enforcement standards to reduce inflow and infiltration:**

  During 2002, members of MWPAAC's RWSP subcommittee are reviewing and commenting on the draft design and enforcement standards to reduce I/I. These draft design and enforcement standards will be used during the pilot projects and will be evaluated as part of the pilot projects.

- **Develop a long-term regional inflow and infiltration proposal for approval by the council:**

  Using information from the flow monitoring and demonstration pilot projects the County will develop a long-term control program for presentation to the King County Council by 2005.

TREATMENT PROCESSES

West Point Treatment Plant

The West Point Treatment Plant is a 133 million gallon per day (design average wet weather flow) HPO activated sludge secondary plant. The plant is designed to treat flows up to 300 MGD. The treatment process includes screening, de-gritting, primary sedimentation in clarifiers, biological treatment using activated sludge and oxygen, secondary clarification, disinfection with chlorine in a chlorine contact channel, and dechlorination. The removed solids are blended and co-thickened with gravity belt thickeners, anaerobically digested, and dewatered by centrifuges. The treatment process for flows above 300 MGD and up to 440 MGD consists of screening, de-gritting, primary sedimentation in clarifiers, disinfection with chlorine in a chlorine contact channel, and dechlorination with Sodium Bisulfite. Raw sludge is co-thickened with gravity belt thickeners, anaerobically digested, and dewatered with centrifuges. The plant discharges to the

Puget Sound via a 3,650-foot long, 240-foot deep outfall. Presented in Appendix D is a schematic of the treatment process.

At the time of this permit issuance, there are 63 permitted industrial users discharging wastewater to the West Point Treatment Plant. The following table summarizes the waste stream characteristics of these users.

Waste Stream Characteristics	Number of Dischargers
pH (acid/caustic) wastewater	46
Metal-bearing wastewater	32
Petroleum-contaminated wastewater	11
High-strength organic wastewater	9

The West Point Treatment Plant is rated as a Class IV plant. There are approximately 120 people working in operations, maintenance, facility, and administration at the West Point Treatment Plant on a daily basis. The plant is operated and maintained 24 hours a day, 7 days a week.

Wet Weather Operation

The secondary treatment units at West Point are designed to treat flows up to 300 MGD. During wet weather conditions, flows to the treatment plant above 300 MGD and up to 440 MGD are given primary treatment and are then bypassed around the secondary treatment process through the plant's secondary diversion pipeline. The diverted flow is then blended together with the secondary treated flows prior to disinfection before discharge from the plant. The intentional bypass of high flows around secondary treatment during wet weather conditions is referred to as *flow blending*. In addition, the EPA's *1994 Combined Sewer Overflow Control Policy* allows for "CSO-related bypass" whereby, under certain conditions, the permit writer may allow wet weather flows to bypass secondary treatment.[1]

When the original facility plan was approved by the Department it was with the understanding that the West Point plant would operate in this manner as this was, and is, considered to be good engineering practice and an acceptable solution for treating a significant portion of the combined sewer overflow volume which occurs in the system during periods of rainfall. The West Point plant has been operating in this manner since 1995 when the secondary plant was constructed. In spite of the blending process the West Point effluent meets, and is required to meet, secondary effluent limitations at all times. There is no separate designated combined sewer overflow outfall at the West Point plant site.

Carkeek CSO Treatment Plant

The Carkeek CSO Treatment Plant operates intermittently, only when the combined sanitary/storm water flow during a storm exceeds the pump capacity of the Carkeek Pump Station (8.4 MGD). The excess flow is stored and treated in the plant and then returned to the pump station at the end of the storm. From the pump station, the flow is pumped to the West Point Treatment Plant.

[1] Combined Sewer Overflow Guidance for Permit Writers, EPA, August, 1995, pp. 4-34.

If flows exceed the storage capacity of the treatment plant, the treated flows are then discharged to Puget Sound. Flows exceeding the capacity of the chlorine contact tank are discharged to Puget Sound through a 4,200-foot long outfall. After the storm, any stored flow remaining in the plant is returned to the pump station for pumping to the West Point Treatment Plant.
The treatment process consists of screening, de-gritting, hypochlorite addition, primary sedimentation, and disinfection with sodium hypochlorite. The hypochlorite is added to control odors and for effluent disinfection. In the grit tank, the flow is aerated and grit is pumped to the storage tanks. From the grit tanks, the flow will move into two primary sedimentation tanks. Any settled solids in these tanks will be pumped to the storage tanks. When both sedimentation tanks are full, the flow moves to the chlorine tank for disinfection. From the chlorine contact tank, disinfected flow will go over a weir and into the outfall to Puget Sound. Once the storm subsides, the flow and solids remaining in the plant are returned to the pump station via the storage tanks and is then pumped to the West Point Plant.

Grit/screening and primary sludge are collected and pumped to the West Point Treatment Plant. Presented in Appendix D is a schematic of the treatment process.

During dry weather and normal flows, the facility operates as a pump station only, pumping wastewater to the West Point Treatment Plant. During these flows, West Point off-site crews service the pump station and CSO treatment processes three times a week. During a storm, West Point Treatment Plant off-site operators staff the plant. Although the plant is designed to run automatically in a storm, personnel are required to be on site for startup, shutdown, preventive maintenance, and operational checks.

Alki CSO Treatment Plant

The Alki Treatment Plant operates intermittently, only when flows in the Alki service area exceed 18.9 MGD. The 18.9-MGD base flow is transferred directly to the West Point Treatment Plant for secondary treatment without entering the Alki plant. Wet weather flows in excess of 18.9 MGD and 7.1 million gallons of storage (West Seattle Tunnel) are diverted to the Alki CSO Treatment Plant for treatment. Treatment consists of screening, primary sedimentation followed by chlorine disinfection. Treated flows are discharged to the Puget Sound through the existing outfall.

Flows in excess of 65 MGD are discharged via the 63rd Avenue pump station outfall, which is a permitted CSO located south of the Alki Treatment Plant. King County is already meeting the Ecology standard of no more than one untreated overflow per year at this location.

Wastewater flow, sludge, and grit are returned to the Alki Trunk for transfer to the West Seattle Tunnel and further conveyance to West Point Treatment Plant. Collected screenings are collected and disposed of in landfills.

DISCHARGE OUTFALL

West Point Treatment Plant

The plant discharges to the Puget Sound via an eight-foot diameter reinforced concrete pipe which is buried beneath the seabed and diffuser that is partially buried. The buried portion of the outfall extends westward over 2,500 feet connecting to the partially buried 600-foot, 200-port diffuser (100 ports per side) and end structure. The 4.5 to 5.75-inch diameter ports, located about one foot above the spring line, are spaced six feet apart. The diffuser terminates about 3,400 feet offshore at a depth of approximately 240 feet below mean lower low water.

Carkeek CSO Treatment Plant

Primary treated and disinfected effluent is discharged to Puget Sound via a 33-inch diameter 4,200-foot outfall, which extends approximately 2,200 feet offshore and terminates at a depth of 200 feet below mean lower low water. The outfall has a "duck billed" check valve at the end.

Alki CSO Treatment Plant

Primary treated and disinfected effluent is discharged to the Puget Sound via a 42-inch diameter pipe, which extends approximately 2,000 feet offshore and terminates at a depth of approximately 143 feet below mean lower low water. Eight 16-inch diameter risers/ports, fitted with rubber check valves, were constructed at the terminus of the outfall. The six risers/ports are spaced 20 feet apart, alternating discharge direction. The diffuser terminates with two 16-inch risers/ports discharging at an angle of 135° with respect to the other risers/ports. The capacity of the outfall is 45 MGD at mean higher high water and 65 MGD at mean lower low water. Flows in excess of 65 MGD are discharged via the 63rd Avenue Pump Station outfall, a permitted CSO location.

Combined Sewer Overflows

King County has 38 combined sewer overflows, discharges of untreated sewage and storm water during periods of heavy precipitation events, within the city of Seattle. The following is a listing of combined sewer overflows and the names of the receiving water.

Discharge No.	CSO Name	Receiving Water
003	Ballard Siphon Regulator	Lake Washington Ship Canal
004	11th Avenue NW (a.k.a. East Ballard Overflow)	Lake Washington Ship Canal
006	Magnolia South Overflow	Elliott Bay/Puget Sound
007	Canal Street Overflow	Lake Washington Ship Canal
008	3rd Avenue West Overflow	Lake Washington Ship Canal
009	Dexter Avenue Regulator	Lake Union
011	East Pine Street Pump Station Emergency Overflow	Lake Washington
012	Belvoir Pump Station Emergency Overflow	Lake Washington (Union Bay)
013	Martin Luther King Way Trunkline Overflow	Lake Washington
014	Montlake Overflow	Lake Washington Ship Canal
015	University Regulator	Lake Washington Ship Canal (Portage Bay)
018	Matthews Park Pump Station Emergency Overflow	Lake Washington
027	Denny Way Regulator	Elliott Bay/Puget Sound

Discharge No.	CSO Name	Receiving Water
028	King Street Regulator	Elliott Bay/Puget Sound
029	Connecticut Street Regulator	Elliott Bay/Puget Sound
030	Lander Street Regulator	Duwamish River – East Waterway
031	Hanford #1 Regulator	Duwamish River – East Waterway
032	Hanford #2 Regulator	Duwamish River – East Waterway
033	Rainier Avenue Pump Station Emergency Overflow	Lake Washington
034	East Duwamish River Siphon/Duwamish Pump Station Emergency Overflow	Duwamish River
035	West Duwamish River Siphon/Duwamish Pump Station Emergency Overflow	Duwamish River
036	Chelan Avenue Regulator	Duwamish River – West Waterway
037	Harbor Avenue Regulator	Duwamish River – West Waterway
038	Terminal 115 Overflow	Duwamish River
039	Michigan Regulator	Duwamish River
040	8th Avenue South Regulator (West Marginal Way Pump Station Emergency Overflow)	Duwamish River
041	Brandon Street Regulator	Duwamish River
042	West Michigan Regulator	Duwamish River
043	East Marginal Way Pump Station Emergency Overflow	Duwamish River
044	Norfolk Street Regulator	Duwamish River
045	Henderson Street Pump Station Emergency Overflow	Lake Washington
048	North Beach Pump Station Emergency Overflow	Puget Sound
049	30th Avenue N.E. Pump Station Emergency Overflow	Lake Washington Ship Canal (Union Bay)
053	53rd Street S.W. Pump Station Emergency Overflow	Puget Sound
054	63rd Street S.W. Pump Station Emergency Overflow	Puget Sound
055	S.W. Alaska Street Overflow	Puget Sound
056	Murray Street Pump Station Emergency Overflow	Puget Sound
057	Barton Street Pump Station Emergency Overflow	Puget Sound

RESIDUAL SOLIDS

West Point Treatment Plant

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Approximately 3,500 tons of grit are generated annually. At the West Point Treatment Plant, screenings are no longer co-mingled with grit except when experiencing mechanical problems with the step screen or ram press. Both grit and screenings are taken to a landfill for disposal.

Primary sludge and waste activated sludge are blended together and thickened by gravity belt thickeners. The thickened sludge is then pumped to one of six anaerobic mesophilic digesters. In 1999, volatile solids reduction in the digesters ranged from 55 to 70.3 percent. From the digesters, the digested sludge is withdrawn and dewatered by one of four centrifuges. Polymers are used in the gravity belt thickeners and centrifuges to aid sludge thickening/dewatering. In 1999, a total of 13,985 dry tons of solids were shipped off site.

Biosolids are used in a variety of land application projects (forestry, agriculture, and soil improvement). A portion of the biosolids is further treated by a privately owned and operated composting facility, which markets the product as GroCo. The King County General Land Application Plan for Biosolids identified the following counties/water resources inventory areas where biosolids are or may be utilized for land application.

County	Water Resource Inventory Area
King	Cedar/Sammamish
Yakima	Lower Yakima
Douglas	Foster, Moses Coulee
Benton	Lower Yakima
Pierce	Nisqually
Adams	Lower Crab

Presented in the following is a summary of the biosolids characteristics for 4th Quarter 1999 samples. Unless noted otherwise, the values presented are reported on a "dry weight basis."

Parameter	4th Quarter Average (mg/Kg)
pH	9
Total Solids	24%
Total Volatile Solids	61%
Organic – N	47,800
Ammonia – N	12,800
Total Kjeldahl Nitrogen	60,600
Total Phosphorus	20,200
Potassium	1,570
Total Sulfur	10,700
Arsenic	7
Boron	15
Cadmium	3.3
Chromium	45
Copper	511
Lead	140
Magnesium	4,880
Manganese	747
Mercury	2
Molybdenum	13
Nickel	37
Selenium	5

Parameter	4th Quarter Average (mg/Kg)
Silver	54
Zinc	798

Carkeek CSO Treatment Plant

During a storm, grit and primary sludge is collected in the storage tanks. The storage tanks are drained to the pump station once the storm subsides. These solids are then pumped to the West Point Plant.

Alki CSO Treatment Plant

During a storm, grit and primary sludge are collected in the storage tanks. The storage tanks are drained to the pump station once the storm subsides. These solids are then pumped to the West Point Plant.

PERMIT STATUS

The previous permit for this facility was issued on January 1, 1996. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, Fecal Coliform Bacteria, Total Residual Chlorine, and Cyanide. In addition to the effluent limits placed on the West Point Sewage Treatment Plant, the previous permit also placed effluent limits for the Carkeek Park Combined Sewer Overflow Treatment Plant on Total Suspended Solids Removal Efficiency, Settleable Solids, Average Number of Events, and Average Flow.

The permit was first modified on June 26, 1998. The Carkeek Treatment Plant Total Suspended Solids limit was changed from 50% removal or better to an effluent limit of 60 mg/L. This effluent limit serves as a surrogate for the 50% removal limit. The Settleable Solids limit was changed from less than 0.3 mL/L/hr measured as monthly average to 1.9 mL/L/hr per event and an annual average limit of 0.3 mL/L/hr.

On October 25, 1999, the permit was modified to incorporate flows from the Alki Combined Sewer Overflow Treatment facility into the West Point Treatment Plant NPDES permit.

An application for permit renewal was submitted to the Department on June 22, 2000, and accepted by the Department on June 28, 2000.

Carkeek CSO Treatment Plant

The previous permit for this facility was WA-002917-3. The prior permit limits were established under the existing West Point Treatment Plant permit, as modified on June 26, 1998.

Alki CSO Treatment Plant

The previous permit for this facility (WA-002901-7) was issued on April 30, 1993, and cancelled on October 25, 1999. Effective October 25, 1999, discharges from the Alki CSO Treatment Plant were incorporated into the West Point Treatment Plant NPDES permit.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

WEST POINT TREATMENT PLANT

On June 28, 1996, Ecology staff conducted a Compliance Evaluation (non-sampling) of the West Point Treatment Plant. On the day of the inspection, the oxygen generation plant was taken off-line, and liquid oxygen was used to supply oxygen to the secondary treatment system.

In accordance with permit requirements, King County completed an Assessment of Flow and Wasteload for the West Point Treatment Plant.

Presented is a summary of the DMR Monthly Report submittals and Ecology's DMR Violation/Warning Summary Report for the period January 1996 through February 2000. (Appendix E provides a complete summary of the DMR data from January 1, 1996 to March 31, 2003.)

Date	Parameter	Type of Value	Units	Value	Permit Limit
May 1996	Fecal Coliform	Weekly Average	#/100 mL	1,526	400
November 1996	Chlorine Residual	Daily Maximum	µg/L	1,560	546
December 1996	Chlorine Residual	Daily Maximum	µg/L	820	546
January 1997	BOD_5	Monthly Average	mg/L	34	30
January 1997	BOD_5	Weekly Average	mg/L	47	45
January 1997	TSS	Monthly Average	mg/L	42	30
January 1997	TSS	Weekly Average	mg/L	59	45
January 1997	TSS	Weekly Average	mg/L	53	45
January 1997	TSS	Monthly Average	lbs./day	60,000	54,000
November 1997	Chlorine Residual	Daily Maximum	µg/L	560	546
April 1998	Chlorine Residual	Daily Maximum	µg/L	830	546
January 1999	BOD_5	Monthly Average	mg/L	32	30
January 1999	BOD_5	Weekly Average	mg/L	47	45
January 1999	BOD_5	Weekly Average	lbs./day	90,000	81,000

In September 1996, there were two short flow diversions around the secondary system. The diversions were reportedly caused by a problem with the IPS pump automatic control staging logic.

In November 1996, a final effluent sample measured chlorine residual at 1,560 µg/L, exceeding the daily maximum of 546 µg/L. The exception was due to improper deployment of a previously tagged out malfunctioning dechlorination pump. After the incident, King County changed standard operating procedures to lock out malfunctioning equipment.

In December 1996, a final effluent sample measured chlorine residual at 820 µg/L exceeding the daily maximum of 546 µg/L. The exception was due to inaccurate on-line final effluent chlorine residual analyzers.

On March 18, 1997, there was a plant bypass of an estimated 21 million gallons due to a complete power outage resulting from a fault in the primary feed cable and an under-voltage condition on the back-up feed. The primary cable was replaced and the back-up feed has been upgraded.

In July and August 1997, there were a number of short flow diversions around the secondary system. The duration of diversions lasted from a few seconds to about five minutes. The causes for these diversions ranged from human error, equipment problems, to software logic testing.

On October 3, 1997, there was a partial plant bypass of an estimated 625,000 gallons. Loss of control power initiated a fail-safe sequence, causing the smaller bypass gate to open.

In November 1997, a daily grab final effluent sample measured 560 µg/L of chlorine residual exceeding the permit limit of 546 µg/L. King County attributed this permit limit exception to high flow, chlorine analyzers out of calibration, and a malfunctioning dechlorination feed pump.

In December 1997, a brief flow diversion around the secondary system of approximately 1.5 minutes occurred during startup of a raw sewage engine. There was no measurable impact to effluent quality.

In March 1998, there were two small sewage bypasses at the plant. In one incidence, a brief power outage caused the diversion gates to begin opening for about five seconds. In a second incidence, an emergency bypass gate was open about 1% for eighteen minutes. Following the incidence, an alarm was installed to better inform operators of "open" command and to take appropriate action.

In April 1998, a sodium bisulfite dechlorination pump malfunctioned resulting in a chlorine residual that exceeded the daily maximum limit. The main control operator was able to start a back-up pump and returned the residual to acceptable levels within 20 minutes.

In May 1998, there was one small sewage bypass at the plant due to human error. The amount of flow diverted around the secondary was too small to register on plant instrumentation. Following the incidence, the crews were reminded to follow proper procedures.

In July 1998, there was one sewage bypass at the plant due to equipment malfunction. Approximately 0.5 million gallons was diverted around the secondary treatment system.

On October 12, 1998, the plant had a power outage resulting in a plant bypass of approximately 41 million gallons. Ecology issued a Notice of Violation and an $18,000 penalty for this unpermitted discharge.

In November 1998, there was one small sewage bypass at the plant due to a control problem. The amount of flow diverted around the secondary was too small to register on plant instrumentation. Following the incidence, a work request was initiated to correct the control problem.

In January 1999, there were three exceptions for BOD. King County attributed the exceptions to a combination of a moderate secondary process upset and the effect of nitrogenous interference from the sampling lines. To reduce nitrogenous interference, West Point planned to use a stronger chlorine solution to shock-dose the sampling lines.

On January 4, 2000, the plant, because of an effluent pump failure and other related problems, discharged approximately 20 million gallons of wastewater to the Puget Sound.

CLASS A WATER RECLAMATION FACILITY

In July 1998, a high total coliform count resulted in a weekly average of 3.2 organisms per 100 milliliters which exceeded the permit limit of 2.2. King County suspected the one high value might be due to technician error.

In August 1998, the Water Reclamation Facility exceeded one total coliform daily maximum and two total coliform weekly averages. One high coliform count incidence was due to low chlorine residual.

In August 1999, a high total coliform count resulted in a weekly average of 3.4 organisms per 100 milliliters which exceeded the permit limit of 2.2. During that month, a total of 264,771 gallons of reclaimed water was used for irrigation purposes outside the plant boundary.

CARKEEK CSO TREATMENT PLANT

In accordance with permit requirements, King County completed an Assessment of Flow and Wasteload for the Carkeek CSO Facility. The assessment evaluated compliance based on the discharge limitations established in the June 26, 1998, NPDES permit modification.

Presented in the following table is a summary of the plant operating data from 1996 through March 2000. (Appendix E provides a complete summary of the DMR data from January 1, 1996 to March 31, 2003.)

Year	Average TSS/yr mg/L	Average Set. Sol./yr mL/L/hr	Flow/year million gallons	Discharge Event(s)/yr	TSS % Removal
1996	45	1.2[1]	144.6	10	54
1997	46	0.2[1]	35.1	10	63
1998	29	0.1	45.1	7	59
1999	24	<0.1	42.2	10	61
2000 (Jan – Mar)	58	<0.1	0.3	1	77
Permit Limits	**60**	**1.9 mL/L/hr[1] 0.3 mL/L/hr[2]**	**46[3]**	**10[3]**	

Note [1]Discharge Limitation (per event)
[2]Discharge Limitation (yearly average)
[3]5-year average

For the first 51 months of the permit cycle, the Carkeek CSO Treatment Plant complied with the Total Suspended Solids and Settleable Solids permit limits. Flow, however, exceeded the permit limit. For the first four years, Carkeek CSO Treatment Plant discharged an annual average flow of 66.8 million gallons exceeding the permit limit of 14 million gallons. For the first four years, Carkeek discharged an annual average of 9.3 events.

King County initiated the Carkeek Overflow Reduction Project to address the high flow issue at Carkeek and identified the following reasons as contributing to the higher than anticipated discharge events and discharge volumes:

- Assumptions used for the predictive modeling in the planning phase, and subsequently used in the permit, did not accurately predict actual flow experience in recent wet years;
- The pumping capacity to West Point Treatment Plant from the Carkeek pump station was lower than expected; and
- Higher flows are reaching the pump station due to conveyance changes and high I/I rates.

In January 2002, King County submitted the Carkeek Overflow Reduction Project as an engineering report. In the report, King County evaluated nine alternatives. The solution to the high flow issue consists of increasing the maximum pumping capacity for the Carkeek Facility from 8.4 MGD to 9.2 MGD. Logically, increasing the maximum pumping capacity of the Carkeek pumping station to 9.2 MGD has the effect of increasing the flow that would be treated at the West Point facility and thus reduces the discharge volume at Carkeek Outfall #1. The preferred alternative also includes a control strategy to limit or "throttle" the maximum flow rate of 9.2 MGD to 8.1 MGD. Throttling of the pumps at the Carkeek Pumping Station would be initiated during those times that may result in an overflow downstream--at the 11th Avenue NW weir. To determine the preferred pumping methodology, King County modeled alternate pumping rates at the station and through this modeling determined the number of overflow events at Carkeek Outfall #1 that corresponded with the rates. King County concluded from the modeling that the NPDES permit limits should be changed from the current permit limitations of 14 MG per year and 8 overflow events to a discharge of 46 MG per year and 10 overflow events per year.

ALKI CSO TREATMENT PLANT

The Alki Treatment Plant began operation as a CSO facility in November 1998. King County has since completed an Assessment of Flow and Wasteload for this facility. The assessment evaluated compliance based on the discharge limitations established in the October 25, 1999, NPDES permit.

Presented in the following table is a summary of the plant operating data for 1998 through March 2000. (Appendix E provides a complete summary of the DMR data from January 1, 1996 to March 31, 2003.)

Year	Average TSS/yr mg/L	Average Set. Sol./yr mL/L/hr	Flow/year million gallons	Discharge Event/yr	TSS % Removal
1998	37	0.3	17.8	2	60
1999	27	0.1	18.6	2	74
2000 (Jan – Mar)	27	0.3	1.8	1	65
Permit Limits	**60**	**1.9 mL/L/hr[1]** **0.3 mL/L/hr[2]**	**108[3]**	**29[3]**	**50**

Note [1]Discharge Limitation (per event)
[2]Discharge Limitation (yearly average)
[3]5-year average

Since November 1998, there were a total of five treated combined sewer overflows discharged from the Alki CSO Treatment Plant. The discharges complied with the permit limits.

The Flow and Wasteload Assessment identified on-going projects to modify and to optimize the facility. Modifications include maintenance work on the scum removal system, the sludge pumping system, and the primary clarifiers. To address the possible "exceedances of the acute chlorine water quality standard . . .," King County is in the process of optimizing the automated sodium hypochlorite disinfection system.

CSO LONG TERM CONTROL PLAN STATUS

The Department approved King County's 1988 CSO Reduction Plan in accordance with the State's requirements. Since that time, the Permittee has submitted the CSO Annual Reports and the CSO Reduction Plan Amendments as required by their permits.

In accordance with EPA's 1994 CSO Policy, King County is required to submit a Long Term Control Plan (LTCP) to include the following elements:

1. Characterization, Monitoring and Modeling of Combined Sewer Systems
2. Public Participation
3. Consideration of Sensitive Areas
4. Evaluation of Alternatives
5. Cost/Performance Consideration
6. Operational Plan
7. Maximizing Treatment at the POTW Treatment Plant
8. Implementation Schedule
9. Post-Construction Compliance Monitoring Program

The Department has received various documents submitted by the Permittee which are considered to be components of the CSO Long Term Control Plan. The list of documents includes but may not be limit to the following:

1997 Regional Wastewater Services Public Opinion Summary
1999 Regional Wastewater Services Plan
2000 CSO Control Plan Update
Task 4 and Task 5 documents

The Department will review these and possibly other documents to confirm that King County has fulfilled the requirement of a Long Term Control Plan (LTCP). The Department will work with the Permittee to establish a document for Departmental approval that will serve as the LTCP.

WASTEWATER CHARACTERIZATION

WEST POINT TREATMENT PLANT

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The following table presents a summary of the effluent characteristics. The Priority Pollutant scan data presented in the table contains only detectable compounds and elements.

Parameter	Maximum Daily (mg/L)	Average Daily (mg/L)	Number of Samples
Ammonia as N	33.9	15.2	158
Chlorine, total residual	0.83	0.094	1096
Total Kjeldahl Nitrogen	36.7	18.2	157
Nitrate Nitrogen	8.40	2.55	157
Nitrite Nitrogen	2.28	0.61	157

Parameter	Maximum Daily (mg/L)	Average Daily (mg/L)	Number of Samples
Oil and Grease	16.6	0.9	145
Phosphorus, ortho	4.1	2.2	158
Total Volatile Solids	378	77	1050
	Maximum Daily (µg/L)	**Average Daily (µg/L)**	
Copper	23	14	18
Zinc	51	41	18
Cyanide	11	1	158
Phenolic Compounds	5	0.4	12
Chloroform	5.8	3.84	12
Dichlorobromo-methane	0.7	0.15	12
Methylene Chloride	3.0	2.27	12
Tetrachloroethylene	3.21	0.63	12
Toluene	1.26	0.28	12
Phenol	3.8	0.32	12
Bis (2-ethylhexyl) phthalate	5.56	2.68	12
Di-n-Butyl Phthalate	6.08	0.77	12
1,4-Dichlorobenzene	2.07	0.64	12

King County conducted acute whole effluent toxicity tests on the secondary effluent from the West Point Treatment Plant from May 1995 to November 1999.

Acute toxicity tests were conducted with *Daphnia pulex* and fathead minnow. In 1995, the effluent samples were tested in 0, 1.3, and 100% concentrations. From 1996 to 1999, the samples were tested in a geometric series of dilutions from 100 to 6.25 plus 2.38% effluent (acute critical effluent concentration). Excluding the July 19, 1995 test, survival was high in all tests ranging from 93% to 100% in 100% effluent concentration. The July 19, 1995, test resulted in 0% survival in 100% effluent concentration and no mortality in either the 1.3% effluent or the control.

Chronic toxicity tests were conducted with *Ceriodaphnia dubia* and fathead minnow in 1995; and with *Menidia beryllina* and *Mysidopsis bahia* from February 1996 to November 1999. The tests were conducted in the same dilution series as the acute toxicity tests. For the tests with *Mysidopsis bahia,* the IC_{50} (inhibition concentration) varied from 49.6% effluent concentration to not calculable due to insufficient toxicity. An IC_{50} value could not be calculated for any of the toxicity tests with *Menidia beryllina* due to a lack of growth inhibition in effluent-exposed larvae as compared to growth of larvae in seawater only (control).

CARKEEK CSO TREATMENT PLANT

The concentration of pollutants in the discharge was reported in the NPDES application. The following table presents a summary of the effluent Priority Pollutant scans for two storm events in 1999.

Carkeek Effluent Concentration (micrograms per liter)

Parameter	Sampling Date				
	1/28/99	**1/29/99**	**2/6/99**	**2/7/99**	**2/8/99**
2-Methylnaphthalene			1.6		
4-Methylphenol	9.4	10.2	13.4	11.1	11.1
Acetone	30.3	22.7	26.1	28.1	26.5
Benzoic Acid	49.7	61.9	81.3	65.4	67.5

Parameter	Sampling Date				
Benzyl Alcohol			6.55	5.29	4.4
Benzyl Butyl Phthalate	0.81	0.66	1.91	1.09	0.94
Bis (2-Ethylhexyl) Phthalate	11	12.8	23	52.3	19
Caffeine	20.4	21.5	22.6	22.8	25.8
Chloroform	2.84	2.88	3.04	2.79	2.71
Coprostanol	188	152	214	202	170
Diethyl Phthalate	4.52	5.42	5.69	5.34	5.49
Dimethyl Phthalate	0.45	0.774	0.49	0.592	0.579
Methylene Chloride	18	1.6			
Phenol			4.1		
Toluene		1.2			
Aluminum	796	370	866	715	582
Barium	18.4	18.2	17.2	15.4	16.9
Calcium	11,000	13,300	11,300	12,300	12,500
Copper	19	22	22.4	20	20.1
Iron	647	385	642	455	414
Magnesium	3,120	3,820	3,170	3,520	3,640
Manganese	50.6	61	51.5	51.4	53.4
Potassium	3,200	3,100	3,500	3,900	3,900
Sodium	14,900	16,300	20,200	21,800	21,200
Zinc	43.9	79.2	47	44.5	41.9

ALKI CSO TREATMENT PLANT

Because there was only one discharge event at the facility after permit issuance, there were no sampling and testing of Priority Pollutants.

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation**.** Effluent limits are not always developed for pollutants that may be in the discharge but not reported as

present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

WEST POINT TREATMENT PLANT

The design criteria for the West Point Treatment Plant are taken from *An Introduction to the WPTP, West Point Treatment Plant Manual* prepared by METRO dated August 1993 and are as follows:

Parameter	Design Quantity
Monthly average flow (maximum month)	215 MGD
Monthly average dry weather flow	110 MGD
Average annual flow	142 MGD
Monthly average wet weather flow	133 MGD
Instantaneous peak flow	440 MGD
BOD_5 influent loading (average annual)	168,000 lbs./day
TSS influent loading (average annual)	181,000 lbs./day

CARKEEK CSO TREATMENT PLANT

The design criteria for the Carkeek Satellite CSO Treatment Plant are taken from the *Facility Plan for the Carkeek Transfer/CSO Facilities Project* prepared by Bown and Caldwell Consulting Engineers dated December 1988 and are as follows:

Parameter	Design Quantity
Average dry weather flow	3.5 MGD
Peak wet weather flow	20 MGD
TSS influent loading	5,100 lbs./day

ALKI CSO TREATMENT PLANT

The design criteria for this treatment facility are taken from *Facilities Plan for Alki Transfer/CSO Project* prepared by HDR Engineering, Inc. dated October 1992 and are as follows:

Parameter	Design Quantity
Peak storm water flow to Alki CSO Treatment Plant	65 MGD
Average flow rate per storm event	7 MGD

Parameter	Design Quantity
Average annual volume	159 mg
TSS influent loading (average annual)	9,580 lbs./day

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

WEST POINT TREATMENT PLANT

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, $CBOD_5$, and TSS are taken from Chapter 173-221 WAC are:

Technology-based Limits

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
$CBOD_5$ (concentration)	Average Monthly Limit is the most stringent of the following: - 250 mg/L - may not exceed fifteen percent (15%) of the average influent concentration (85% removal). Average Weekly Limit = 40 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration (85% removal) Average Weekly Limit = 45 mg/L
Chlorine	Average Monthly Limit = 0.5 mg/L Average Weekly Limit = 0.75 mg/L

The existing permit has an average monthly total residual chlorine limit of 216 µg/L and a maximum daily total residual chlorine limit of 546 µg/L. These limits were derived based on the state Water Quality Standards of 13 µg /L for acute and 7.5 µg /L for chronic along with an acute dilution factor of 42:1 and a chronic dilution factor of 231:1.

Since the effective date of this permit, January 1, 1996, the facility is able to comply with the average monthly limit, but exceeded the maximum daily limit four times. According to the discharge monitoring reports, these exceedances were caused either by human errors or

equipment failures. Malfunctioning of the dechlorination feed pump resulted in three of the four permit violations. The elimination of these problems would eliminate these maximum daily violations.

New dilution modeling results were used to determine new total residual chlorine limits. The new limits were derived based on the state Water Quality Standards of 13 µg /L for acute and 7.5 µg /L for chronic along with an acute dilution factor of 32:1 and a chronic dilution factor of 153:1 (refer to appendix F, Water Quality Permit Based Limit Calculation). The resulting permit limits are an **average monthly total residual chlorine limit of 160 µg/L and a maximum daily total residual chlorine limit of 420 µg/L**.

Monthly total residual chlorine effluent loading (lbs./day) were calculated as the maximum monthly design flow (215 MGD) x concentration limit (0.1589 mg/L) x conversion factor (8.34) = 284.9 lbs./day chlorine. Rounding the number to 3 significant figures, the monthly solids loading limit is **285 lb/day total residual chlorine**.

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly $CBOD_5$ effluent mass loadings (lbs./day) were calculated as the maximum monthly design flow (215 MGD) x concentration limit (25 mg/L) x conversion factor (8.34) = 44827.5 lbs./day $CBOD_5$. Rounding the number to 3 significant figures, the monthly organic loading limit is **44,800 lb/day $CBOD_5$**.

The weekly average effluent mass loading is calculated as (40/25) x monthly loading = 71724 lbs./day $CBOD_5$. Rounding the number to 3 significant figures, the weekly average organic loading limit is **71,700 lb/day $CBOD_5$**.

Monthly total suspended solids effluent mass loading (lbs./day) were calculated as the maximum monthly design flow (215 MGD) x concentration limit (30 mg/L) x conversion factor (8.34) = 53793 lbs./day TSS. Rounding the number to 3 significant figures, the monthly solids loading limit is **53,800 lb/day TSS**.

The weekly average effluent mass loading is calculated as (45/30) x monthly loading = 80689.5 lbs./day TSS. Rounding the number to 3 significant figures, the weekly average solids loading limit is **80,700 lb/day TSS**.

In accordance with WAC 173-221-050 subsection (3) which states that, "for domestic wastewater facilities which receive flows from combined sewer, the department shall decide on a case-by-case basis whether any attainable percent removal can be defined during wet weather." The West Point Treatment Plant receives a more dilute influent during wet weather due to a collection system that combines both sanitary sewage and storm water. A dilute influent can result in the 85% removal criteria for $CBOD_5$ and TSS being difficult to achieve. The department has determined that the percent removal requirements for $CBOD_5$ and TSS shall be reduced to 80% during the months of November through April (wet weather months) when the influent is likely to have lower than normal concentrations of both $CBOD_5$ and TSS. However, the concentration and mass loading limits as stated above remain in affect year-round.

Based on empirical data provided on the monthly Discharge Monitoring Reports (DMR) from January, 1996 through March, 2003, the West Point Treatment Plant influent has consistently had lower concentrations of both BOD_5 and TSS in the influent during the wet weather months as summarized on the table below.

	Influent BOD_5	**Influent TSS**
Long Term Average (LTA) for Jan., 1996 through April, 2003	183 mg/L	195 mg/L
Difference from LTA Wet Season (Nov.–April)	-30 mg/L	-27 mg/L
Difference from LTA Dry Season (May-Oct.)	+33 mg/L	+29 mg/L
Percent Below LTA during Wet Season	***16%***	***14%***
Percent Above LTA during Dry Season	18%	15%

The CSO status requires as one of the Nine Minimum Controls (NMC, no. 4) that the West Point Treatment Plant maximizes flows to the plant during the wet season in order to minimize CSO discharges. In the decision to reduce the removal requirement to 80% during the wet system, the department has recognized that removal efficiencies may be compromised in order to accomplish the more important goal of maximizing flow to the treatment plant and minimizing CSO discharges.

The Department recognizes that increased flows to the treatment plant over time may impact the achievable removal efficiency during wet weather conditions. The percent removal requirement during the wet season will be evaluated during each permit cycle and the removal requirement will be established based on recent plant performance data.

CARKEEK AND ALKI CSO TREATMENT PLANT

Both Carkeek and Alki CSO Treatment Plant provide primary treatment which consists of sedimentation of solids and disinfection of the effluent prior to discharge. WAC 173-245-020 subsection 16, defines the performance standard for the primary treatment of CSOs as follows, "Primary treatment means any process which removes at least fifty percent of the total suspended solids (TSS) from the waste stream, and discharges less than 0.3 ml/l/hr of setteable solids". Additionally, Ecology's Criteria for Sewage Works Design[2], clarifies that the 50% removal is to be assessed on an annual average basis.

In order to comply with the State regulation, the limit for both CSO treatment plants is based on overall percent removal of total suspended solids of 50% or greater. The overall percent removal on an annual basis includes the removal achieved at the CSO Treatment Plant and that achieved at the West Point Treatment Plant.

Compliance of the CSO Treatment Plant effluent with the 0.3 ml/l/hr of setteable solids limit will be based on a yearly average due to the intermittent and highly variable operation of the CSOs. The monthly limit of 1.9 ml/l/hr of setteable solids monthly maximum is based on empirical data. This limit is considered reasonable and achievable based on the intermittent and highly variable operation of the CSO Treatment Plants.

[2] Washington State Department of Ecology, Criteria for Sewage Works Design, December, 1998, p. C3-18.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTIDEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this

water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

Critical Conditions

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

Mixing Zones

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

Description of the Receiving Water

These three facilities (West Point Treatment Plant, Carkeek CSO Treatment Plant, Alki CSO Treatment Plant) discharge to Puget Sound which is designated as a Class AA receiving water in the vicinity of the outfall. Characteristic uses include the following:

> water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	14 organisms/100 mL maximum geometric mean
Dissolved Oxygen	7.0mg/L minimum
Temperature	13.0 degrees Celsius maximum or incremental increases above background

pH	7.0 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix E for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

West Point Treatment Plant

King County determined: the maximum boundaries of the mixing zones for the West Point Treatment Plant are defined as follows[3]:

> The maximum size of the mixing zone singularly or in combination with other such mixing zone, shall not extend in any direction from the discharge port(s) for a distance greater than 430 feet; and also, the maximum size of the zone of acute criteria exceedance, singularly or in combination with other such zones where acute criteria may be exceeded, shall not extend beyond 43 feet as measured independently from the discharge port(s). The dilution attained within the chronic mixing zone (430 feet) for the critical conditions is 153:1 for the plume flowing in the direction of the current. The dilution attained within the zone of Acute Criteria Exceedence (43 feet) for the critical condition is 32:1 in the plume flowing in the direction of the current.

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of the Plumes Model.

	Acute	Chronic
Aquatic Life	32:1	153:1
Human Health, Carcinogen		153:1
Human Health, Non-carcinogen		153:1

The dilution factors may change as a result of new modeling that may be submitted by the Permittee based on new or additional data or assumptions used in the modeling. New modeling and the resulting dilution ratios for the purpose of calculating water-quality based limits must be approved by the Department.

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for

[3] King County Department of Natural Resources, Effluent Dilution Modeling West Point Wastewater Treatment Plant Outfall, June, 2002.

example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

BOD_5--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature—Due to the high dilution achieved (153:1) under critical conditions, there is no predicted violation of the Water Quality Standard for Surface Waters. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 153.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge from the West Point Treatment Plant:

AMMONIA
BIS(2-ETHYLHEXYL) PHTHALATE
CHLORINE
CHLOROFORM
COPPER
CYANIDE
DIBUTYLPHTHALATE
1,4 DICHLOROBENZENE
DICHLOROBROMOMETHANE
METHYLENE CHLORIDE
PHENOL
TETRACHLOROETHYLENE

TOLUENE
ZINC

A reasonable potential analysis (See Appendix F) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for **Chlorine** to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix F) at the critical condition.

The determination of potential pollutants listed under WAC 173-201A to exceed the water quality criteria was conducted using receiving water and waste discharge conditions that represent the highest potential for toxicity in the receiving water environment. This condition is called the critical condition. The chronic zone critical condition in this case occurs in July, and the acute zone critical condition in April occurs. The parameters used in the critical condition modeling are acute dilution factor of 32, and chronic dilution factor of 153.

The reasonable potential for exceeding water quality criteria was evaluated with procedures given in EPA, 1991. Among the suspected and tested pollutants, only chlorine showed a reasonable potential for violation of the Water Quality Standard at the specified dilution factors (see Appendix F).

Effluent limits were derived for chlorine, which was determined to have a reasonable potential for violation of the Water Quality Standards. Effluent limits were calculated using methods from EPA, 1991 (see Appendix F).

The resultant effluent limit is as follows:

Parameter	Monthly Average	Daily Maximum
Chlorine	0.16 mg/L	0.42 mg/L

The effluent limitations for cyanide identified in the prior modification of this permit were removed from this permit since the results of analyses conducted on 158 samples showed effluent cyanide concentrations never exceeding 11 ug/l.

Carkeek CSO Treatment Plant

King County determined: the maximum boundaries of the mixing zones for the West Point Treatment Plant are defined as follows[4]:

> The maximum size of the mixing zone singularly or in combination with other such mixing zone, shall not extend in any direction from the discharge port(s) for a distance greater than 395 feet; and also, the maximum size of the zone of acute criteria exceedance, singularly or in combination with other such zones where acute criteria may be exceeded, shall not extend beyond 39.5 feet as measured independently from the discharge port(s). The dilution attained within the chronic mixing zone for the critical conditions is 197:1 for the plume flowing in the direction of the current. The dilution attained within the zone of Acute Criteria

[4] King County Department of Natural Resources, Effluent Dilution Modeling Carkeek CSO Outfall, June, 2002.

Exceedence for the critical condition is 38:1 in the plume flowing in the direction of the current.

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of the Plumes Model.

	Acute	Chronic
Aquatic Life	38:1	197:1
Human Health, Carcinogen		197:1
Human Health, Non-carcinogen		197:1

The dilution factors may change as a result of new modeling that may be submitted by the Permittee based on new or additional data or assumptions used in the modeling. New modeling and the resulting dilution ratios for the purpose of calculating water-quality based limits must be approved by the Department.

BOD_5--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations would be protective of dissolved oxygen criteria in the receiving water.

Based on previous DMR data as provided in appendix F, the Permitee meets or exceeds the technology based limit for secondary treatment therefore no BOD limit has been established for the CSO Treatment Plant.

Temperature—Due to the high dilution achieved (197:1) under critical conditions, there is no predicted violation of the Water Quality Standard for Surface Waters. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 197.

Under critical conditions there was a prediction of a violation of the fecal coliform criterion for the receiving water with the technology-based limit. An effluent limit of 2800 organisms/100 ml was found to be protective of the fecal coliform criterion at the boundary of the chronic dilution zone and therefore was imposed instead of the technology-based limitation. (The water quality standard for fecal coliform is 14/100mL, multiplied by chronic dilution factor of 197 equals 2758 which was rounded up to 2 significant figures.) It was very conservatively assumed that there would be no bacterial die off in the receiving water between the point of discharge and the edge of the chronic dilution zone.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently

with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge from the Carkeek CSO Treatment Plant:

BIS(2-ETHYLHEXYL) PHTHALATE
CHLORINE
CHLOROFORM
COPPER
DIETHYLPHTHALATE
PHENOL
TOLUENE
ZINC

A reasonable potential analysis (See Appendix F) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for **Chlorine** to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix F) at the critical condition.

The determination of potential pollutants listed under WAC 173-201A to exceed the water quality criteria was conducted using receiving water and waste discharge conditions that represent the highest potential for toxicity in the receiving water environment. This condition is called the critical condition. The chronic zone critical condition in this case occurs in November (1998), and the acute zone critical condition in November (1998) occurs. The parameters used in the critical condition modeling are acute dilution factor of 38, and chronic dilution factor of 197.

The reasonable potential for exceeding water quality criteria was evaluated with procedures given in EPA, 1991. Among the suspected and tested pollutants, only chlorine showed a reasonable potential for violation of the Water Quality Standard at the specified dilution factors (see Appendix F).

Effluent limits were derived for chlorine, which was determined to have a reasonable potential for violation of the Water Quality Standards. Effluent limits were calculated using methods from EPA, 1991 (see Appendix F).

The resultant effluent limit is as follows:

Parameter	**Monthly Average**	**Daily Maximum**
Chlorine	NA	0.49 mg/L

The Department allows the Pemittee 2 years from the date of issuance of the permit to comply with the chlorine and fecal coliform limits.

Akli CSO Treatment Plant

King County determined: the maximum boundaries of the mixing zones for the Alki CSO Treatment Plant are defined as follows[5]:

> The maximum size of the mixing zone singularly or in combination with other such mixing zone, shall not extend in any direction from the discharge port(s) for a distance greater than 340 feet; and also, the maximum size of the zone of acute criteria exceedance, singularly or in combination with other such zones where acute criteria may be exceeded, shall not extend beyond 34 feet as measured independently from the discharge port(s). The dilution attained within the chronic mixing zone (340 feet) for the critical conditions is 120:1 for the plume flowing in the direction of the current. The dilution attained within the zone of Acute Criteria Exceedence (34 feet) for the critical condition is 22:1 in the plume flowing in the direction of the current.

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of the Plumes Model.

	Acute	Chronic
Aquatic Life	22:1	120:1
Human Health, Carcinogen		120:1
Human Health, Non-carcinogen		120:1

The dilution factors may change as a result of new modeling that may be submitted by the Permittee based on new or additional data or assumptions used in the modeling. New modeling and the resulting dilution ratios for the purpose of calculating water-quality based limits must be approved by the Department.

BOD_5--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations would be protective of dissolved oxygen criteria in the receiving water.

Based on previous DMR data as provided in appendix F, the Permitee meets or exceeds the technology based limit for secondary treatment therefore no BOD limit has been established for the CSO Treatment Plant.

Temperature—Due to the high dilution achieved (120:1) under critical conditions, there is no predicted violation of the Water Quality Standard for Surface Waters. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

[5] King County Department of Natural Resources, Effluent Dilution Modeling-Alki, June, 2000.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 120.

Under critical conditions there was a prediction of a violation of the fecal coliform criterion for the receiving water with the technology-based limit. An effluent limit of 1700 organisms/100 ml was found to be protective of the fecal coliform criterion at the boundary of the chronic dilution zone and therefore was imposed instead of the technology-based limitation. (The water quality standard for fecal coliform is 14/100mL, multiplied by chronic dilution factor of 120 equals 1680 which was rounded up to 2 significant figures.) It was very conservatively assumed that there would be no bacterial die off in the receiving water between the point of discharge and the edge of the chronic dilution zone.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge from the Alki CSO Treatment Plant:

CHLORINE

A reasonable potential analysis (See Appendix F) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for **Chlorine** to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix F) at the critical condition.

The determination of potential pollutants listed under WAC 173-201A to exceed the water quality criteria was conducted using receiving water and waste discharge conditions that represent the highest potential for toxicity in the receiving water environment. This condition is called the critical condition. The chronic zone critical condition in this case occurs in November, and the acute zone critical condition in November occurs. The parameters used in the critical condition modeling are acute dilution factor of 22, and chronic dilution factor of 120.

The reasonable potential for exceeding water quality criteria was evaluated with procedures given in EPA, 1991. Among the suspected and tested pollutants, only chlorine showed a reasonable potential for violation of the Water Quality Standard at the specified dilution factors (see Appendix F).

Effluent limits were derived for chlorine, which was determined to have a reasonable potential for violation of the Water Quality Standards. Effluent limits were calculated using methods from EPA, 1991 (see Appendix F).

The resultant effluent limit is as follows:

Parameter	Monthly Average	Daily Maximum
Chlorine	NA	0.29 mg/L

The Department allows the Pemittee 2 years from the date of issuance of the permit to comply with the chlorine and fecal coliform limits.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC_{50}, $EC_{50,}$ IC_{25}, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center 360-407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

An effluent characterization for acute and chronic toxicity was conducted during the a previous permit term. In accordance with WAC 173-205-060, the Permittee must repeat this effluent characterization for the following reason:

> The Department's "Permit Writer's Manual" requires a facility of the size and characteristics of the West Point facility to conduct chronic and acute WET testing characterization at a frequency of four (4) tests/year. Additionally, the current EPA permit reapplication form requires facilities with a design flow of 1.0 MGD or greater to perform WET testing prior to application. It is proposed that this permit require WET testing to be accomplished during the last year of the permit prior to reapplication.

When the WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water toxicity, the Permittee will not be given WET limits and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard." The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the effluent is likely to have chemicals of concern for human health. The discharger's high priority status is based on knowledge of data indicating regulated chemicals occur in the discharge.

A determination of the discharge's potential to cause an exceedance of the Water Quality Standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of Water Quality Standards, thus an effluent limit is not warranted. The results of this analysis are shown in Appendix F.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined that this discharge has the potential to cause a violation of the sediment quality standards because of the nature of the effluent and existence of major and categorical industrial users within the collection system and also based on the sampling data collected and submitted by the Permittee to the Department previously.

The Permittee will develop a Sediment Sampling and Analysis Plan. Results of the sampling and analysis will be submitted in a Sediment Data Report.

COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED JANUARY 1, 1996

Parameter	Existing Permit Limits	Proposed Permit Limits
West Point Treatment Plant (Outfall 001)		

Parameter	Existing Permit Limits	Proposed Permit Limits
BOD_5, monthly average conc.	30 mg/L	**$CBOD_5$, 25mg/L**
BOD_5, monthly average load	54,000 lbs./day	**$CBOD_5$, 44,000 lbs./day**
TSS, monthly average conc.	30 mg/L	30 mg/L
TSS, monthly average load	54,000 lbs./day	**53,800 lbs./day**
BOD_5, weekly average conc.	45 mg/L	**$CBOD_5$, 40 mg/L**
BOD_5, weekly average load	81,000 lbs./day	**$CBOD_5$, 71,100 lbs./day**
TSS, weekly average conc.	45 mg/L	45 mg/L
TSS, weekly average load	81,000 lbs./day	**80,700 lbs./day**
Fecal Coliform, monthly	200/100 mL	200/100 mL
Fecal Coliform, weekly	400/100 mL	400/100 mL
pH	6-9	6-9
Chlorine, monthly average	0.216 mg/L	**160 µg/L**
Chlorine, maximum day	0.516 mg/L	**420 µg/L**
Carkeek CSO Treatment Plant (Outfall 046)		
TSS, average conc.	60 mg/L	**50% total removal of TSS on an annual basis**
Fecal Coliform, monthly average	No limit	**2,800/100 mL, geometric mean**
Settleable Solids	1.9 ml/l/hour, per event	**1.9 ml/l/hour, monthly maximum**
Settleable Solids, yearly average	0.3 ml/l/hour	0.3 ml/l/hour
Number of Discharge Events/Year	8	**10**
Average Flow/Year	14 million gallons/year	**46 million gallons/year**
Chlorine, maximum day	No limit	**490 µg/L**
Alki CSO Treatment Plant (Outfall 091)		
TSS, monthly average conc.	60 mg/L	**50% total removal of TSS on an annual basis**
Fecal Coliform, monthly average	No limit	**1,700/100 mL, geometric mean**
Settleable Solids	1.9 ml/l/hour, per event	**1.9 ml/l/hour, monthly maximum**
Settable Solids, yearly average	0.3 ml/l/hour	0.3 ml/l/hour
Number of Discharge Events/Year	29/year	29/year
Average Flow/Year	108 million gallons/year	108 million gallons/year
Chlorine, maximum day	No limit	**290 µg/L**

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring of biosolids quantity and quality is necessary to determine the appropriate uses of the biosolids. Biosolids monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July, 2002) for the activated sludge treatment facility.

LAB ACCREDITATION

With the exception of certain parameters, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* The laboratory at this facility is accredited for General Chemistry and Microbiology. The Permittee's environmental lab at W. Ewing Street is additionally accredited for trace metals by ICP-OES and ICP-MS, mercury, inorganics, organics by GC and GC-MS, bioassays, and microbiology in matrices including liquids, sediments and tissues.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4. restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains condition S.5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in permit condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

Since the Permittee has a Biosolids Program, the final use and disposal of biosolids from this facility is regulated by U.S. EPA under 40 CFR 503. The disposal of other solid waste is under the jurisdiction of the King County Health Department. Sludge and biosolids monitoring requirements included in Specific Condition 2A of the Permit are included to affect the Pretreatment Program.

PRETREATMENT

To provide more direct and effective control of pollutants discharged, King County has been delegated permitting, monitoring, and enforcement authority for industrial users discharging to their treatment system. The Department oversees the delegated Industrial Pretreatment Program to assure compliance with federal pretreatment regulations (40 CFR Part 403) and categorical standards and state regulations (chapter 90.48 RCW and chapter 173-216 WAC).

The Department may modify this permit to incorporate additional requirements relating to the establishment and enforcement of local limits for pollutants of concern. Any permit modification is subject to formal due process procedures pursuant to state and federal law and regulation.

COMBINED SEWER OVERFLOWS

In accordance with RCW 90.48.480 and Chapter 173-245 WAC, proposed permit Condition S.12 requires the Permittee to submit an annual Combined Sewer Overflow (CSO) report and to update its CSO reduction plan at the time of permit renewal.

OUTFALL EVALUATION

Proposed permit condition S.13 requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

WATER RECLAMATION AND REUSE

The West Point Treatment Plant generates reclaimed water for internal use only.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for 5 years.

REFERENCES FOR TEXT

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations(http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/wastewater/index.html

Washington State Department of Ecology.

2002. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on September 6, 2000 and September 13, 2000 in *The Seattle Times* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on October 31, 2003 in *The Seattle Times* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 425-649-7202, or by writing to the address listed above.

This permit and fact sheet was written by Chandler Smith and Karen Burgess.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD5 – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celcius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiraty passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--RESPONSE TO COMMENTS

Comments received from King County:

1. Permit Summary of Permit Report Submittals- S10B Sediment Data Report – page 5 of 48 - The Data report submission data is listed here as December 31, 2005. We feel that this date is too ambitious and request that you revise the date to August 2006, the date presented in West Point Sediment Sampling Work Plan. This date assumes sediment and biological data collection will occur in the Fall of 2005, and that time for sample processing, bioassays runs (if necessary), validation of the data, report write-up, and data entry into SedQual database format will take much more that the 3 months given by the currently proposed submission date of December 05. These various steps take significant amounts of time and thus we have always indicated that 9 months, at the least, are needed to complete this data analysis process and reporting process. Thus we request that the data already laid out in that Plan, Aug 2006 be the submittal date required.

RESPONSE 1:
This request is acceptable to the Department. This change has been made to final permit.

2. Permit Footnote on Interim Limits tables for Alki and Carkeek – pages 8, 10 of 48 – We would suggest removing Footnote "d" from these interim tables since it does not apply to the limits in these tables.

RESPONSE 2:
This correction has been made to the final permit.

3. Permit Sheet General Condition G4 – Reporting Planned Changes – page 43 of 48 – We reiterate here our comments of September 22, 03 regarding this general condition and urge the Department to revise this condition as soon as possible. This condition refers to "…3) a significant change in the Permittee's sludge use or disposal practices." as triggering a specific notification to Ecology under this permit. Since such actions are regulated under a separate Ecology Biosolids Permit, having this provision in the NPDES permit is duplicative and could confuse reporting and interaction with the Department. Therefore we strongly recommend that this general condition be revised to remove the reference to sludge and biosolids.

RESPONSE 3:
This comment will be brought to the Department's Permit Writer's Work Group for further consideration. This change will not be made for issuance of this permit.

4. Fact Sheet Combined Sewer Overflow - Page 6 of 47- Please change the reference to the number of CSOs to 38.

RESPONSE 4:
Changes can not be made to the fact sheet. The response to this comment acknowledges that the correct number of CSO's is 38.

5. Fact Sheet Comparison of Effluent Limits Table – Page 36, 37 of 47 – The limits noted as proposed include all the final limits for the CSO treatment facilities. There is a 2 year compliance period before some of those limits will be in force. We suggest that for those limits that will not apply for 2 years that they be footnoted with a footnote indicating - "These limits will apply as of January 2006."

RESPONSE 5:
Changes can not be made to the fact sheet. The response to this comment acknowledges the clarification that the proposed limits at the CSO treatment facilities for chlorine and fecal coliform are not applicable until January, 2006.

Comments from Ecology's Sediment Management Unit (Sharon Brown):

The following are my comments after reviewing the subject documents and the contents of SMU's SEDQUAL (Sediment Quality Information System) database.[6]

West Point Wastewater Treatment Plant

Sediment quality is addressed in the current permit language.

Carkeek CSO Treatment Plant

Per the contents of SEDQUAL, Figure 1 shows sediment sampling stations in the vicinity of the Carkeek outfall representing SEDQUAL survey CARKEK00 (Carkeek Park Outfall Monitoring, October 2000) with the symbol, Φ, denoting the outfall end. The percent total organic carbon (TOC) ranged from 0.09 - 0.18 at Carkeek which is outside the 0.5 - 3% range used to compare chemistry results to the *Sediment Management Standards*.[7] Therefore, the dry weight chemical concentration was compared to the 1988 Puget Sound dry weight LAETs (lowest apparent effects threshold).[8] Based on the dry weight chemical comparison, **hexachlorobutadiene was found in exceedances at all six sampling stations** with a value of 13 ppb dry compared to a criteria of 11 ppb dry.

SMU's SEDQUAL does not contain any biological data for the CARKEK00 survey. Under a separate memorandum, I will ask King County if biological data exists for this and later surveys and if so, for King County to forward the data to SMU in SEDQUAL data entry templates. This is of importance, because confirmatory biological tests should be performed when sediment samples are found to exceed chemical criteria (i.e., biological results override chemical results).

Attachment 1 contains suggested permit language concerning sediment quality in the vicinity of the Carkeek CSO TP outfall. Given that toxics are present in the Carkeek discharge and its discharge limit has been increased to 46 million gallons per year from 14 MG/yr, it is prudent to empirically confirm the sediment conditions at this outfall (Fact Sheet, p. 32 and *Summary of Changes*).

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[6] SEDQUAL's URL: http://www.ecy.wa.gov/programs/tcp/smu/sedqualfirst.htm.
[7] Ecology 1995. *Sediment Management Standards, Chapter 173-204*. Amended December 1995.
[8] Ecology 1989. *Contaminated Sediments Criteria Report*. Table B-2. April 1989. Also, represented by SEDQUAL SQV (Sediment Quality Value) group code: 88_PS_LAET_DRY.

Alki CSO Treatment Plant

Figure 1 presents sediment sampling stations in the vicinity of the Alki outfall representing SEDQUAL surveys ALKI (Alki Survey, 1984) and ALKI9497 (NPDES Alki Subtidal Monitoring, 1994 - 1997) with the symbol, Φ, denoting the outfall end. Like Carkeek, a low percent TOC (0.05 - 0.32%) meant a chemical comparison to the dry weight LAETs was also performed at Alki. A look at the most recent (1997) survey results, identified by a red × in Figure 2, found dry weight **exceedances of hexachlorobutadiene, n-nitrosodiphenylamine, and 2,4-dimethylphenol relative to the outfall end**. All three chemicals were found at each of the six 1997 stations.

SMU's SEDQUAL does not contain any biological data for the ALKI9497 survey. Under a separate memorandum, I will ask King County if biological data exists for this and later surveys and if so, for King County to forward the data to SMU in SEDQUAL data entry templates.

Attachment 1 contains suggested permit language concerning sediment quality in the vicinity of the Alki CSO TP outfall. Given that toxics are present in the Alki discharge and exceedances surround the outfall, it is prudent to empirically confirm the sediment conditions at this outfall (Fact Sheet, p. 34).

Figure 1. Carkeek and Alki CSO Treatment Plant Sampling Stations.

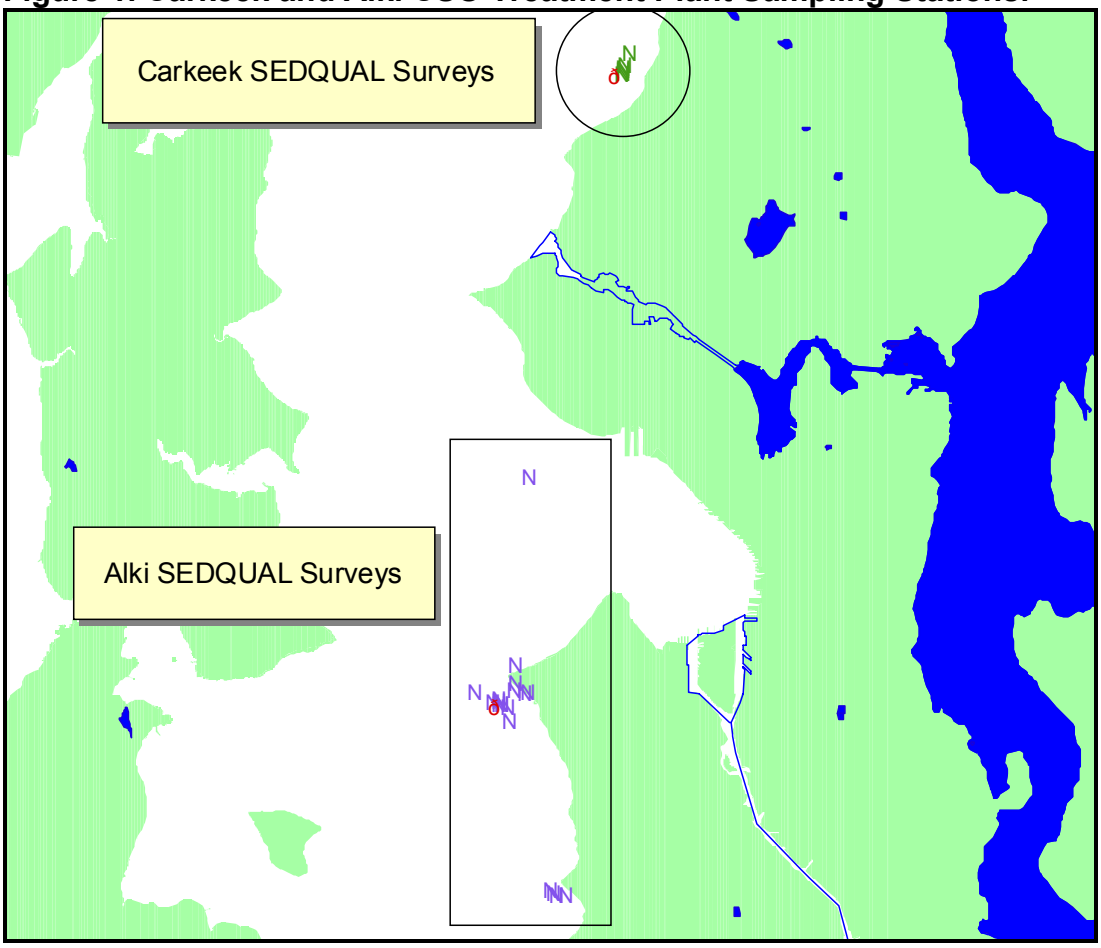
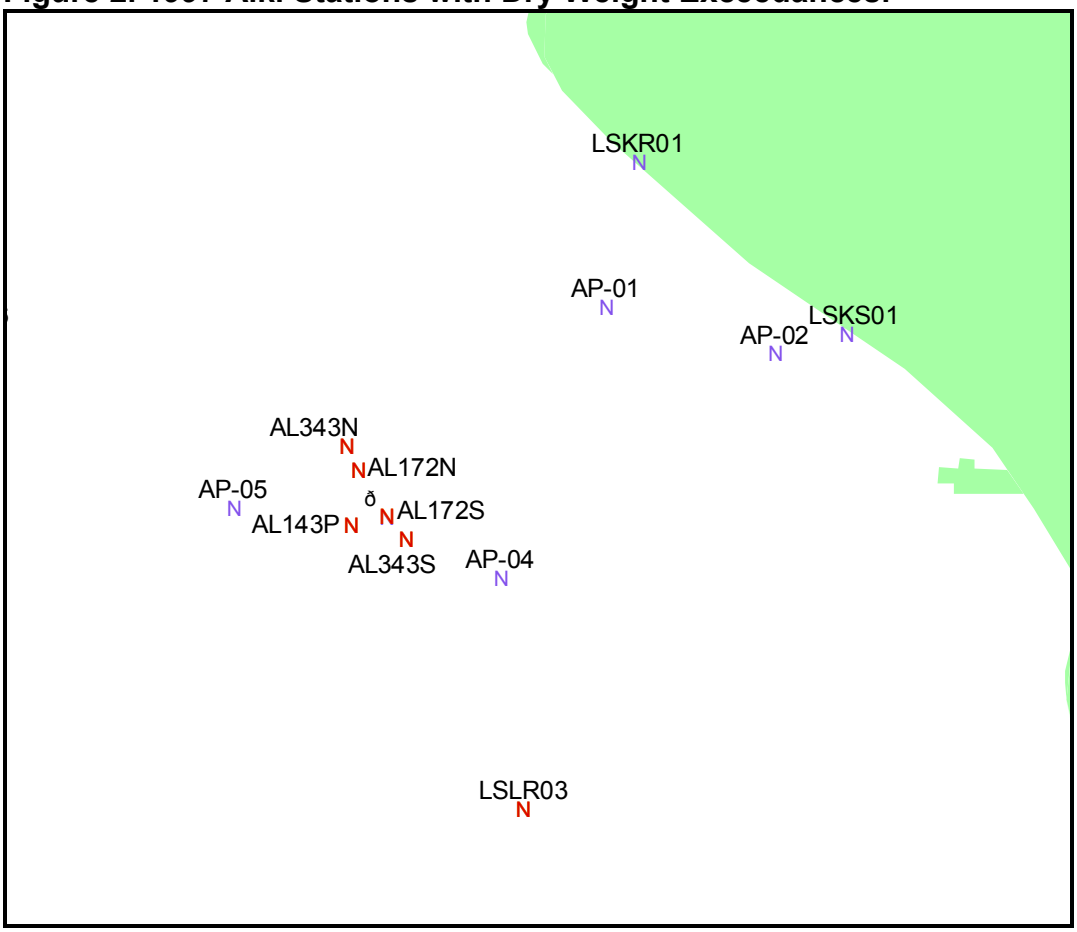


Figure 2. 1997 Alki Stations with Dry Weight Exceedances.



S10. SEDIMENT MONITORING (MARINE)

A. Sediment Sampling and Analysis Plan

The Permittee shall submit to the Department for review and approval a Sediment Sampling and Analysis Plan for sediment monitoring *no later than one year after permit effective date*. The purpose of the plan is to recharacterize sediment quality in the vicinity of the ***Carkeek / Alki CSO TP outfall*** discharge location. The Permittee shall follow the guidance provided in the Sediment Source Control Standards User Manual, Appendix B: Sediment Sampling and Analysis Plan (Ecology, 2003).

B. Sediment Data Report

Following Department approval of the Sediment Sampling and Analysis Plan, sediments will be collected and analyzed. The Permittee shall submit to the Department a Sediment Data Report containing the results of the sediment sampling on or before the date as stated on the Summary of Permit Report Submittals. The Sediment Data Report shall conform with the approved Sampling and Analysis Plan.

The Data Report shall also include electronic copies of the sediment chemical and biological data reported in the Department's Sediment Quality Information System template format.

Additional Carkeek Text
The above requirements shall be enforced, unless the Permittee can provide the Department with chemical and/or biological test results of surveys performed subsequent to 2000 that show an improved sediment quality below the *Sediment Management Standards* in the vicinity of the Carkeek outfall. The test results should be provided to the Department electronically in Sediment Quality Information System template format with an accompanying document summarizing the sediment study and results.

Additional Alki Text
The above requirements shall be enforced, unless the Permittee can provide the Department with chemical and/or biological test results of surveys performed subsequent to 1997 that show an improved sediment quality below the *Sediment Management Standards* in the vicinity of the Alki outfall. The test results should be provided to the Department electronically in Sediment Quality Information System template format with an accompanying document summarizing the sediment study and results.

RESPONSE TO SMU COMMENTS:
King County provided additional data to be reviewed by the Department. The sediment data for Alki CSO Treatment Plant outfall that was taken in 2001 had MDLs at or below the SQS for the 3 chemicals of concern, Hexachlorbutadiene, N-Nitrosodiphenylamine and 2,4-Dimethylphenol. None of these chemicals were found to be present in the sediment in detectable quantities. King County provided additional data for Carkeek with regard to exceedances of hexachlorobutadiene. As no additional sediment data was available, they searched their Laboratory Information Management Systems for detectable levels of hexachlorobutadiene in samples that included the treatment plant influent, effluent, reclaimed water, digested sludge, raw sludge and TCLP leachate. No detectable level of the chemical was found in any wastewater matrix.

An excerpt from Sharon Brown's letter dated December 9, 2003 indicates that Ecology will not require additional characterization of the sediment at this time. "Given the receipt of new data, I am withdrawing my November 25th request for recharacterization of sediment quality in the vicinity of Alki and Carkeek outfalls. However, I do request that King County submit to SMU in SEDQUAL templates sediment monitoring data that is routinely gathered at West Point, Carkeek, Renton, and Alki outfalls."

Comments from Ecology's TCP Program-NWRO:

Background

These comments relate to the 9 King County CSOs within the Lower Duwamish Waterway (LDW) Superfund Site:

- 031 – Hanford #1 Overflow CSO (via Diagonal Storm Drain),
- 034 – E. Duwamish River Siphon/Duwamish Pump Station Emergency Overflow CSO
- 035 – W. Duwamish River Siphon/Duwamish Pump Station Emergency Overflow CSO
- 038 – Terminal 115 Overflow (CSO)

- 039 – Michigan Regulator (a.k.a. S. Michigan Regulator) CSO
- 040 – 8th Ave S. Regulator CSO (West Marginal Way Pump Station Emergency Overflow)
- 041 – Brandon Street Regulator CSO
- 042 – W. Michigan Regulator CSO (a.k.a. SW Michigan St. Regulator)
- 044 – Norfolk Street Regulator CSO
- 043 – E. Marginal Pump Station Emergency Overflow CSO

These CSOs have either confirmed sediment contamination in their areas, or the potential to cause sediment contamination. Chapter 173-204 WAC, the Washington State Sediment Management Standards (SMS) are federally approved water quality standards in the State of Washington, and are jointly implemented by the Toxics Cleanup and Water Quality Programs. SMS citations relevant to the comments below are attached.

Lower Duwamish Waterway Sediment Site

Sediments in the five river-mile long Lower Duwamish Waterway are currently being investigated and cleaned up under MTCA, RCRA, and Superfund authorities. The waterway is listed as a Superfund and MTCA site, and is 303(d) listed based on water quality exceedences in sediments. A wide range of contaminants are present, with polychlorinated biphenyls and polycyclic aromatic hydrocarbons as major concerns. Ecology and EPA are implementing a two-phase Remedial Investigation/Feasibility Study with the Lower Duwamish Waterway Group (City of Seattle, Boeing, Port of Seattle, King County). Phase 1 has identified 7 early action cleanup areas, and data gaps to fill during Phase 2. Phase 2 (to be completed in approximately 2006) will determine if further cleanups are necessary beyond the 7 early action areas.

Sediment Monitoring

The NPDES permit should direct King County to propose and implement a plan to monitor for potential recontamination of sediments associated with the 9 Lower Duwamish CSOs:

- Where post sediment cleanup monitoring is ending. When cleanups are needed in sediments near a CSO, monitoring will be required through the cleanup order. This monitoring generally continues for 5-10 years, depending on the situation. However, as post-sediment cleanup monitoring phases out, the NPDES permit should direct King County to propose and implement a plan to monitor for potential recontamination.

- Where Phase 2 of the Lower Duwamish work determines that sediments near particular CSOs *do not* need cleanup. Recontamination of sediments is still possible at these CSOs, and the NPDES permit should direct King County to propose and implement a plan to monitor for potential recontamination.

Example #1: Post-cleanup Sediment Monitoring to end at Norfolk CSO (044)

Approximately 2 acres of sediments immediately adjacent to the Norfolk CSO were cleaned up in 1999. The primary contaminant was PCBs. The project was managed by King County under a 1991 Natural Resource Damage Assessment settlement with NOAA. King County has been monitoring the Norfolk area sediments on an annual basis since the cleanup was completed. This monitoring is due to phase-out in March of 2004.

The most recent monitoring report shows an increase in metals, though not yet above the Sediment Quality Standards (SQS) of 173-204 Sediment Management Standards (SMS). The SQS represents sediment concentrations of individual chemicals below no adverse biological effects to benthic invertebrates are expected. Continued monitoring is particularly important for the Norfolk CSO, given that completion of the Henderson/Martin Luther King Jr./Norfolk CSO Control Project will expand the acreage tributary to the Norfolk CSO, and potentially increase impacts to sediments.

TCP recommends that the NPDES permit include this language:

"King County shall propose and implement a monitoring plan for Norfolk CSO-area sediments in order to determine if CSO discharges are exceeding WAC 173-204 Sediment Management Standards. The plan shall include provisions for submitting data to Ecology in the Sediment Quality Database (SEDQUAL) templates."

Example #2: Post-sediment cleanup monitoring to begin at Duwamish/Diagonal Way Cleanup (Hanford #1 Overflow (031)/E. Duwamish River Siphon/Duwamish Pump Station Emergency Overflow (034))

Hanford CSO has an average overflow of 65 MGY per year (11 events). The Duwamish CSO has not overflowed since 1989. Though not part of this NPDES permit, it should be noted that the City of Seattle has 8 CSOs that discharge through the Diagonal Storm Drain.

These two CSOs are associated with the Duwamish/Diagonal Way CSO/Storm Drain sediment cleanup that began in November 2003. Approximately seven acres of PCB, phthalate and metals contaminated sediments will be dredged and capped by February 2004. The project is managed by King County under the 1991 NRDA settlement. King County will begin 5-10 years of post-sediment cleanup monitoring in the spring of 2004.

To address the Duwamish/Diagonal, and monitoring needs at future sediment cleanups in the Lower Duwamish, TCP recommends that the NPDES permit include this language:

"Post-sediment cleanup monitoring will be implemented for all sediment cleanup sites in the Lower Duwamish Waterway, as directed by the appropriate cleanup regulation. Generally monitoring will occur for 5-10 years. Ecology will revisit the post-cleanup sediment monitoring schedules for these sites to determine when sediment monitoring should become a requirement of the NPDES permit."

Example #3: CSOs where no sediment cleanup is necessary

Where Phase 2 of the Lower Duwamish Work determines that sediment cleanup is not necessary, these CSOs still have the potential to recontaminate sediments.

TCP recommends that the NPDES permit include this language:

"Phase 2 of the Lower Duwamish Waterway Remedial Investigation work (to be completed in approximately 2006) may determine that cleanup of sediments in the area of some King County CSOs is not required. For these CSOs (post Phase 2 completion) King County shall propose and implement a monitoring plan in order to determine if CSO discharges are exceeding WAC 173-204 Sediment Management Standards. The plan shall include provisions for submitting data to Ecology in the Sediment Quality Database (SEDQUAL) templates."

Sediment Impact Zones

Sediment Impact Zones, where applicable, are required to manage impacts to sediment from wastewater discharges. SMS 173-204-410 Sediment quality goal and sediment impact zone applicability (3)(c) states that "the department shall implement the standards of WAC 173-204-400 through 173-204-420 so as to prevent the creation of new contaminated sediment cleanup sites . . ." And (6)(a) "Any person with a new or existing permitted wastewater discharge shall be required to meet the standards of WAC 73-204-400 through 173-204-420." These standards include source control requirements to manage and prevent the creation of new sediment cleanup sites.

TCP recommends that the NPDES permit contain the following language:

"Based on the results of any sediment monitoring data associated with the nine King County CSOs in the Lower Duwamish, the department may require application for a sediment impact zone authorization under authority of chapter 90.48 RCW (WAC 173-204-415(2)(a))."

Sediment Management Standards – Citations for Monitoring and Sediment Impact Zones

Sediment Monitoring
The SMS address monitoring permitted outfalls for source control as follows:

- WAC 173-204-400 (4) As determined necessary, the department shall require existing permitted discharges to evaluate the potential for the permitted discharge to cause a violation of the applicable sediment quality standards…

- WAC 173-204-400 (5) Within permits authorizing existing discharges to surface waters of the State of Washington, the department may specify appropriate locations and methodologies for the collection and analysis of representative samples of wastewater, receiving-water, and sediment to evaluate the potential for the discharge to cause a violation of the applicable sediment quality standards…

- WAC 173-204-400 (6) In establishing the need for…individual permit monitoring conditions, the department shall consider multiple factors relating to the potential for

a discharge to cause a violation of the applicable sediment quality standards… including but not limited to… (c) Sediment chemical concentration and biological effects levels

- WAC 173-204-400 (8) As determined necessary, the department shall modify wastewater discharge permits whenever it appears the discharge causes a violation, or creates a substantial potential to cause a violation of the applicable sediment quality standards.

Sediment Impact Zones

Sediment Impact Zones, where applicable, are required to manage impacts to sediment from wastewater discharges. SMS citations addressing Sediment Impact Zones includes:

- SMS 173-204-410 Sediment quality goal and sediment impact zone applicability (3)(c) states that "the department shall implement the standards of WAC 173-204-400 through 173-204-420 so as to prevent the creation of new contaminated sediment cleanup sites . . ."

- And SMS 173-204-410 (6)(a) "Any person with a new or existing permitted wastewater discharge shall be required to meet the standards of WAC 73-204-400 through 173-204-420." These standards include source control requirements to manage and prevent the creation of new sediment cleanup sites.

RESPONSE TO TCP COMMENTS:

The Water Quality Program and the Toxic Cleanup Program (TCP) came to agreement that King County must complete the planned 5-year post clean-up monitoring before additional monitoring requirements are included in the permit. TCP-NWRO, provided the following background information with regard to the Norfolk project.

1) *Norfolk CSO*

As part of the 1991 Natural Resources Damage Assessment settlement between the natural resource trustee agencies (NOAA, USFW, the Muckleshoot and Suquamish Tribes, and the State of Washington), and King County and the City of Seattle, a 2-acre sediment cleanup was completed adjacent to the Norfolk CSO and other municipal and private storm drains in 1999. King County managed this cleanup in partial fulfillment of the settlement.

A 5-year sediment monitoring program was initiated after the cleanup. One of the goals of the monitoring is to determine the occurrence, nature, and rate of any recontamination of sediments at this site. Monitoring has occurred yearly, and reports have been submitted to the trustee agencies, including Ecology. The fifth and final round of monitoring will take place in the spring of 2004. When the 5 years of monitoring is complete, King County will analyze the sediment data, discussing whether or not recontamination is occurring. If post-cleanup monitoring determines that recontamination is occurring at levels above the Sediment Management

Standards (Chapter 173-204 WAC), additional monitoring and other source control actions may be required by Ecology.

2) *Sediment Impact Zones*

Sediment Impact Zones, where applicable, are required under the Sediment Management Standards (SMS), WAC 173-204 to manage impacts to sediment from wastewater discharges. SMS 173-204-410 Sediment quality goal and sediment impact zone applicability (3)(c) states that "the department shall implement the standards of WAC 173-204-400 through 173-204-420 so as to prevent the creation of new contaminated sediment cleanup sites . . ." And (6)(a) "Any person with a new or existing permitted wastewater discharge shall be required to meet the standards of WAC 73-204-400 through 173-204-420." These standards include source control requirements to manage and prevent the creation of new sediment cleanup sites. Based on any evidence of potential sediment recontamination from a particular source, the department may require application for a sediment impact zone authorization under authority of chapter 90.48 RCW (WAC 173-204-415(2)(a)) for that source.

Language has been added to condition S12. of the permit to address the requirement for King County to comply with both the Water Quality Standards, Chapter 173-210A WAC and the Sediment Management Standards, Chapter 173-204 WAC.

Upon completion of the post clean-up monitoring and evaluation of the final report, the Department may determine that continued monitoring is needed at the Norfolk CSO site to address the issue of potential recontamination at the site. If needed, this permit could be reopened for modification or a consent order could be issued to require that King County perform the necessary monitoring.

APPENDIX D--PROCESS FLOW DIAGRAMS

West Point WWTP

Carkeek CSO Treatment Plant

Alki CSO Treatment Plant

APPENDIX E--OUTFALL MAPS

West Point Wastewater Treatment Plant
Carkeek CSO Treatment Plant
Alki CSO Treatment Plant

APPENDIX F--DISCHARGE MONITORING REPORT SUMMARY

West Point Wastewater Treatment Plant
Carkeek CSO Treatment Plant
Alki CSO Treatment Plant

APPENDIX G--TSD CALCLUATION SPREADSHEETS

TSD refers to the EPA Technical Support Document (TSD) for Water Quality-Based Toxics Control upon which the reasonable potential calculations are based.

West Point Wastewater Treatment Plant
Carkeek CSO Treatment Plant
Alki CSO Treatment Plant